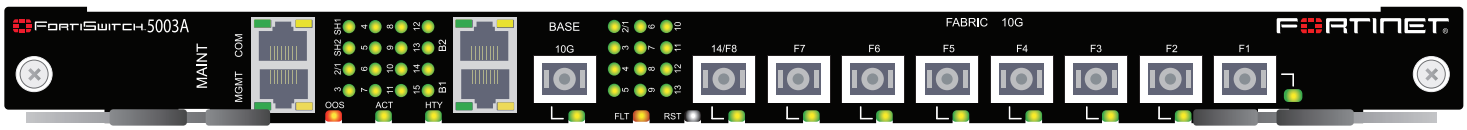
FortiSwitch™-5003A

System Guide



A detailed guide to the FortiSwitch-5003A system. This *FortiSwitch-5003A System Guide* describes the FortiSwitch-5003A hardware features, how to install the FortiSwitch-5003A board in a FortiGate-5000 series chassis, and how to configure the FortiSwitch-5003A system.

The most recent versions of this and all FortiGate-5000 series documents are available from the FortiGate-5000 page of the Fortinet Technical Documentation web site (http://docs.forticare.com).

Visit http://support.fortinet.com to register your FortiSwitch-5003A system. By registering you can receive product updates, technical support, and FortiGuard services.

FORTINET
UNIFIED THREAT MANAGEMENT SOLUTIONS

FortiSwitch-5003A System Guide

Preliminary-01-30000-77803-20080917

Warnings and cautions

Only trained and qualified personnel should be allowed to install or maintain FortiGate-5000 series equipment. Read and comply with all warnings, cautions and notices in this document.

CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.

Caution: You should be aware of the following cautions and warnings before installing FortiGate-5000 series hardware

- Turning off all power switches may not turn off all power to the FortiGate-5000 series equipment. Some circuitry in the FortiGate-5000 series equipment may continue to operate even though all power switches are off. Follow all instructions in the procedures in this document for disconnecting FortiGate-5000 series equipment from power sources, telecommunications links and networks before installing, or removing FortiGate-5000 series components, or performing other maintenance tasks. Failure to do following these instructions can result in personal injury or equipment damage.
- Install FortiGate-5000 series chassis at the lower positions of a rack to avoid making the rack top-heavy and unstable.
- Do not insert metal objects or tools into open chassis slots.
- Electrostatic discharge (ESD) can damage FortiGate-5000 series equipment. Only perform the procedures described in this document from an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an anti-static wrist strap and attaching it to an available ESD connector such as the ESD sockets provided on FortiGate-5000 series chassis.
- Make sure all FortiGate-5000 series components have reliable grounding. Fortinet recommends direct connections to the building ground.
- If you install a FortiGate-5000 series component in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Make sure the operating ambient temperature does not exceed Fortinet's maximum rated ambient temperature.
- Installing FortiGate-5000 series equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- FortiGate-5000 series chassis should be installed by a qualified electrician.
- FortiGate-5000 series equipment shall be installed and connected to an electrical supply source in accordance with the applicable codes and regulations for the location in which it is installed. Particular attention shall be paid to use of correct wire type and size to comply with the applicable codes and regulations for the installation / location. Connection of the supply wiring to the terminal block on the equipment may be accomplished using Listed wire compression lugs, for example, Pressure Terminal Connector made by Ideal Industries Inc. or equivalent which is suitable for AWG 10. Particular attention shall be given to use of the appropriate compression tool specified by the compression lug manufacturer, if one is specified.

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FortiSwitch-5003A system

The FortiSwitch-5003A board provides 10/1-gigabit fabric backplane channel layer-2 switching and 1-gigabit base backplane channel layer-2 switching in a dual star architecture for the FortiGate-5140 and FortiGate-5050 chassis. The FortiSwitch-5003A board provides a total capacity of 200 Gigabits per second (Gbps) throughput.

The FortiGate-5140 chassis is a 14-slot ATCA chassis and the FortiGate-5050 chassis is a 5-slot ATCA chassis. In both chassis the FortiSwitch-5003A board is installed in the first and second hub/switch fabric slots. For most versions of the FortiGate-5140 and 5050 chassis the hub/switch fabric slots are slots 1 and 2. For more information about these chassis see the *FortiGate-5140 Chassis Guide* and the *FortiGate-5140 Chassis Guide*.

You can use the FortiSwitch-5003A board for fabric and base backplane layer-2 switching for FortiGate-5000 boards installed in slots 3 and up in FortiGate-5140 and FortiGate-5050 chassis. Usually you would use the base channel for management traffic (for example, HA heartbeat traffic) and the fabric channel for data traffic. FortiSwitch-5003A boards can be used for fabric and base backplane layer-2 switching within a single chassis and between multiple chassis.

The FortiSwitch-5003A system also supports 802.3ad layer-2 link aggregation, 802.1q VLANs, and 802.1s Multi-Spanning Tree Protocol (MTSP) for the fabric channels. You can use these features to configure link aggregation and support redundant FortiSwitch-5003A switch configurations to distribute traffic to multiple FortiGate-5000 boards. The FortiGate-5000 boards must operate in Transparent mode, all are managed separately and all must have the same configuration.

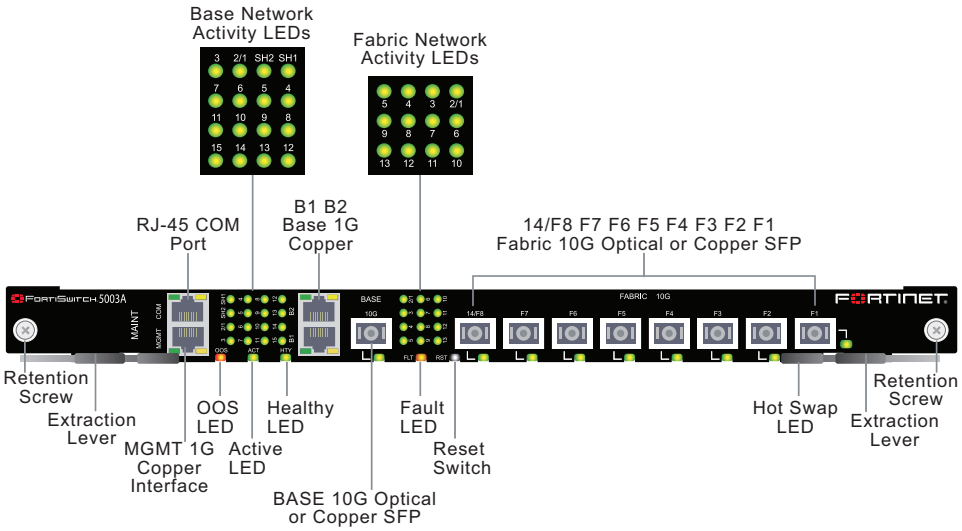
A FortiSwitch-5003A board in hub/switch fabric slot 1 provides communications on fabric channel 1 and base channel 1. A FortiSwitch-5003A board in hub/switch fabric slot 2 provides communications on fabric channel 2 and base channel 2. If your chassis includes one FortiSwitch-5003A board you can install it in hub/switch fabric slot 1 or 2 and configure the FortiGate-5000 boards installed in the chassis to use the correct fabric and base backplane interfaces.

For a complete 10-gigabit fabric backplane solution you must install FortiGate-5000 hardware that supports 10-gigabit connections. For example, a FortiGate-5001A board combined with a FortiGate-RTM-XB2 module provides two 10-gigabit fabric interfaces. You can install the FortiGate-5001A boards in chassis slots 3 and up and FortiGate-RTM-XB2 modules in the corresponding RTM slots on the back of the chassis.

The FortiSwitch-5003A board includes the following features:

- One 1-gigabit base backplane channel for layer-2 base backplane switching between FortiGate-5000 boards installed in the same chassis as the FortiSwitch-5003A
- One 10/1-gigabit fabric backplane channel for layer-2 fabric backplane switching between FortiGate-5000 boards installed in the same chassis as the FortiSwitch-5003A
- Two front panel base backplane one-gigabit copper gigabit interfaces (B1 and B2) that connect to the base backplane channel

Figure 1: FortiSwitch-5003A front panel



- One front panel base backplane 10-gigabit optical or copper SFP+ interface (BASE 10G) that connects to the base backplane channel
- Eight front panel fabric backplane 10-gigabit optical or copper SFP+ interfaces (14/F8, F7, F6, F5, F4, F3, F2, and F1)
- One gigabit out of band management ethernet interface (MGMT)
- One RJ-45, RS-232 serial console connection (COM)
- Mounting hardware
- LED status indicators
- IEEE 802.1q VLANs
- IEEE 802.3ad layer-2 link aggregation
- Link aggregation using a hash algorithm based on source and destination IP addresses
- Multi-Spanning Tree Protocol (MTSP) (IEEE 802.1s) to support redundant FortiSwitch-5003A boards and external MTSP-compatible switches
- Heartbeat between FortiGate-5001A and FortiGate-5005FA2 boards and the FortiSwitch-5003A over the fabric channel to support MTSP (configurable from the FortiGate-5001A and FortiGate-5005FA2 systems)
- Standard FortiOS command line interface (CLI) for configuring fabric switch settings (VLANs, MTSP, trunks, and so on)

Front panel LEDs and connectors

From the FortiSwitch-5003A font panel you can view the status of the board LEDs to verify that the board is functioning normally. The front panel includes a reset switch for restarting the FortiSwitch-5003A board.

The front panel also contains connectors to the fabric and base channels, an out of band management ethernet interface, and an RJ-45 RS-232 console port for connecting to the FortiSwitch-5003A CLI.

LEDs

Table 1 lists and describes the FortiSwitch-5003A front panel LEDs.

Table 1: FortiSwitch-5003A front panel LEDs and switches

LED		State	Description
OOS (Out of Service)		Off	Normal operation.
		Red	Out of service. The LED turns on if the FortiSwitch-5003A board fails. The LED may also flash briefly when the board is powering on.
ACT (Active)		Green	The FortiSwitch-5003A board is powered on and operating normally.
		Yellow	Caution status. Caution status is indicated by the fault condition of the HTY and FLT LEDs.
		Off	The board is not connected to power.
HTY (Healthy)		Green	The FortiSwitch-5003A board is powered on and operating normally.
		Off	The board health system has detected a fault.
FLT (Fault)		Off	Normal operation.
		Yellow	Cannot establish a link to a configured interface or another connection problem external to the FortiSwitch-5003A board. This LED may indicate issues that do not affect normal operation.
RST (Reset switch)		Press and hold Reset for three seconds to restart the FortiSwitch-5003A board.	
Base Network Activity LEDs		Solid Green	Indicates this interface is connected to the 1-gigabit base channel interface of a FortiGate-5000 board. Table 2 on page 8 lists the base network activity LEDs and the interface that each represents.
		Blinking Green	Indicates 1-gigabit network traffic on this interface.
		Off	No link.
Fabric Network Activity LEDs		Solid Green	Indicates this interface is connected to the 10/1-gigabit fabric channel interface of a FortiGate-5000 board. Table 4 on page 10 lists the fabric network activity LEDs and the interface that each represents.
		Blinking Green	Indicates 10/1-gigabit network traffic on this interface. Table 4 on page 10 lists the fabric network activity LEDs and the interface that each represents.
		Off	No link.
MGMT, B1, B2 (Management and base 1-gigabit LEDs)	Link/Act (Left LED)	Solid Green	Indicates this interface is connected with the correct cable and the attached network device has power.
		Blinking Green	Indicates network traffic on this interface.
		Off	No Link
	Speed (Right LED)	Green	Connection at 1 Gbps.
		Amber	Connection at 100 Mbps.
		Off	Connection at 10 Mbps.

Table 1: FortiSwitch-5003A front panel LEDs and switches (Continued)

LED	State	Description
BASE 10G, 14/F8, F7, F6, F5, F4, F3, F2, F1 (Base and Fabric 10 gigabit LEDs)	Solid Green	Indicates this interface is connected to a 10-gigabit network device with the correct cable and the attached network device has power.
	Blinking Green	Indicates 10-gigabit network traffic on this interface.
	Off	No link.
HS (Hot Swap)	Blue	The FortiSwitch-5003A is ready to be hot-swapped (removed from the chassis). If the HS light is blue and no other LEDs are lit the FortiSwitch-5003A board has lost power.
	Flashing Blue	The FortiSwitch-5003A is changing from hot swap to running mode or from running mode to hot swap. This happens when the FortiSwitch-5003A board is starting up or shutting down.
	Off	Normal operation. The FortiSwitch-5003A board is in contact with the chassis backplane.

Base channel interfaces

Table 2 lists and describes the FortiSwitch-5003A base backplane channel interfaces. The base backplane interfaces are not configurable or visible from the FortiSwitch-5003A CLI.

Figure 2: FortiSwitch-5003A base network activity LEDs

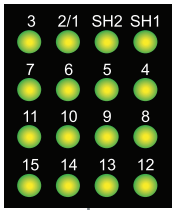


Table 2: Base channel interfaces and network activity LEDs

Interface Name	Description
SH1	If the FortiSwitch-5003A board is in the first hub/switch fabric slot, this LED indicates a backplane connection to shelf manager 1. If the FortiSwitch-5003A board is in second hub/switch fabric slot this LED indicates a backplane connection to shelf manager 2. This LED may not be lit even if a shelf manager is present if the shelf manager is configured to use its front panel interface.
15 and SH2	Not used.
2/1	Base channel connection between base channels 1 and 2. The 2/1 LED is lit if there is any board capable of connecting to the base channel in the other slot. For example, if the FortiSwitch-5003A board is installed in the first hub/switch fabric slot, this LED will be lit if any board is installed in the second hub/switch fabric slot, including a FortiSwitch-5003A board or any FortiGate-5000 board.
3 to 14	Base channel connection to FortiGate-5000 boards in chassis slots 3 to 14.

Table 2: Base channel interfaces and network activity LEDs

Interface Name	Description
B1 and B2	Front panel gigabit base channel interfaces B1 and B2. Use these interfaces to connect your network to the base channel, to connect base channel 1 to base channel 2, or to connect a base channel on one chassis to a base channel on another chassis.
BASE 10G	Front panel 10-gigabit base channel interface. Use this interface to connect a 10-gigabit network to the base channel. 10-gigabit communication is not supported across the base channels but this interface is still available if you need to connect the base channel to a 10-gigabit network.

Fabric channel interfaces

Table 3 lists and describes the FortiSwitch-5003A fabric channel interfaces. You can configure fabric interface settings, group fabric interfaces into trunks, and configure MSTP spanning tree settings for fabric interfaces from the FortiSwitch-5003A CLI.

Table 3: Fabric channel interfaces

Interface Name		Description
Front Panel	**CLI***	
2/1	**slot-2/1**	Interface between fabric channel 1 and fabric channel 2. If there are two FortiSwitch-5003A boards installed in a chassis this interface can be used to communicate between them. In some configurations you may have to disable this communication. See the *FortiGate-5000 Backplane Communication Guide* for more information.
3 to 13	**slot-3 to slot-13**	Fabric backplane slots 3 to 13. The 3 to 13 fabric network activity LEDs are lit if there are FortiGate boards in chassis slots 3 to 13.
14/F8	**slot-14/f8**	Front panel interface 14/F8. Fabric backplane slot 14 and front panel interface 14/F8 share the same FortiSwitch-5003A switch port. By default the the front panel interface 14/F8 is enabled and fabric backplane slot 14 is disabled. You can change this setting using a switch on the FortiSwitch-5003A board. See “Setting the FortiSwitch-5003A configuration switch” on page 13.
F1 to F7	**f1 to f7**	Front panel 10-gigabit fabric interfaces F1 to F7. Use these interfaces to connect your network to the fabric channel, to connect fabric channel 1 to fabric channel 2, or to connect a fabric channel on one chassis to a fabric channel on another chassis.
* You can configure settings for FortiSwitch-5003A fabric interfaces from the FortiSwitch-5003A CLI. The CLI columns show the names of the interfaces as they appear on the FortiSwitch-5003A CLI.		

The fabric network activity LEDs show links and network activity for the interfaces and connections listed in Table 4.

Figure 3: FortiSwitch-5003A fabric network activity LEDs

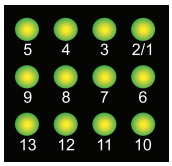


Table 4: Fabric network activity LEDs

Fabric network activity LED	Interface or connection
2/1	Fabric channel connection between fabric channel 1 and fabric channel 2. This LED is lit if there are two FortiSwitch-5003A boards installed in the chassis to indicate fabric backplane communication between them.
3 to 13	Fabric backplane connection to FortiGate-5000 boards in chassis slots 3 to 13.

Front panel connectors

Table 5 lists and describes the FortiSwitch-5003A front panel connectors.

Table 5: FortiSwitch-5003A connectors

Connector	Type	Speed	Protocol	Description
MGMT	RJ-45	10/100/1000 Base-T	Ethernet	Copper gigabit connection to out of band management interface.
COM	RJ-45	9600 bps 8/N/1	RS-232 serial	Serial connection to the command line interface.
B1, B2	RJ-45	10/100/1000 Base-T	Ethernet	Copper gigabit connection to the base backplane channel.
BASE 10G	SFP+	10 Gbps	Ethernet	SFP+ 10 gigabit connection to the base backplane channel.
FABRIC 10G, 14/F8, F7, F6, F5, F4, F3, F2, F1	SFP+	10 Gbps	Ethernet	SFP+ 10 gigabit connection to the fabric backplane channel.

FortiSwitch-5003A configurations

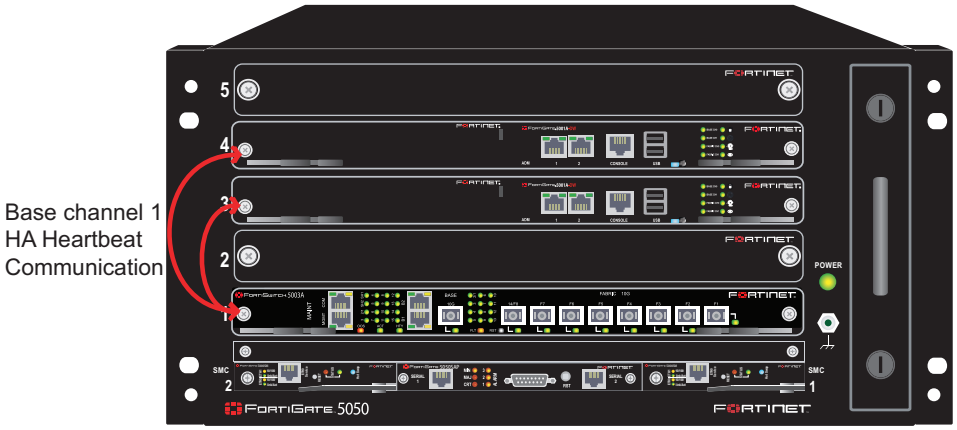
You can operate the FortiSwitch-5003A board as a fabric and base channel layer-2 switch for any FortiGate-5000 board. The FortiSwitch-5003A board is compatible with all FortiGate-5000 boards.

See the *FortiGate-5000 Backplane Communication Guide* for information about FortiSwitch-5003A fabric and base channel switching. This document also contains a FortiSwitch-5003A CLI reference.

Base and fabric gigabit switching within a chassis

Figure 4 shows a FortiGate-5050 chassis with a FortiSwitch-5003A board in slot 1 and two FortiGate-5001A boards in slots 3 and 4. In this configuration the FortiGate-5001A boards are using base channel 1 for HA heartbeat communication. The FortiGate-5001A boards use base1 as the HA heartbeat interface.

Figure 4: FortiSwitch-5003A base channel 1 HA heartbeat communication

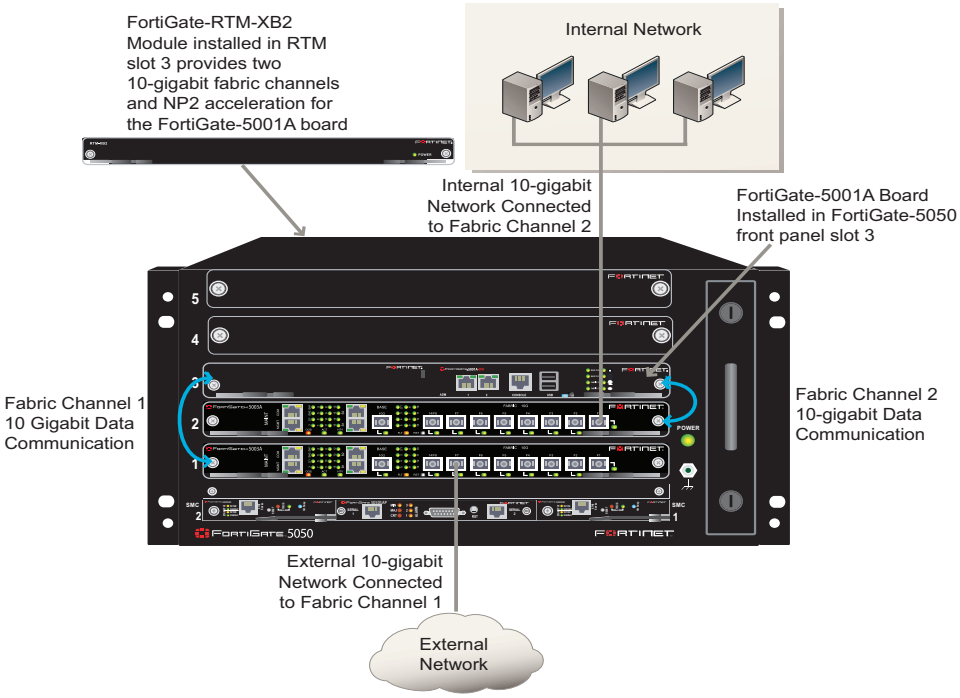


Base and fabric 10-gigabit switching within a chassis

One FortiGate-RTM-XB2 provides 10-gigabit connections to both FortiGate-5001A fabric channels. The FortiGate-RTM-XB2 also provides NP2 packet acceleration for each fabric channel. To effectively use NP2 acceleration, packets must be received by the FortiGate-5001A board on one fabric channel and exit from the FortiGate-5001A board on the same fabric channel or on the other fabric channel. See the *FortiGate-RTM-XB2 System Guide* for more information.

Figure 5 shows a FortiGate-5050 chassis containing two FortiSwitch-5003A boards and one FortiGate-5001A board. Using these components this chassis supplies 10-gigabit connectivity between the external and internal network.

Figure 5: Example 10-gigabit connection between internal and external networks



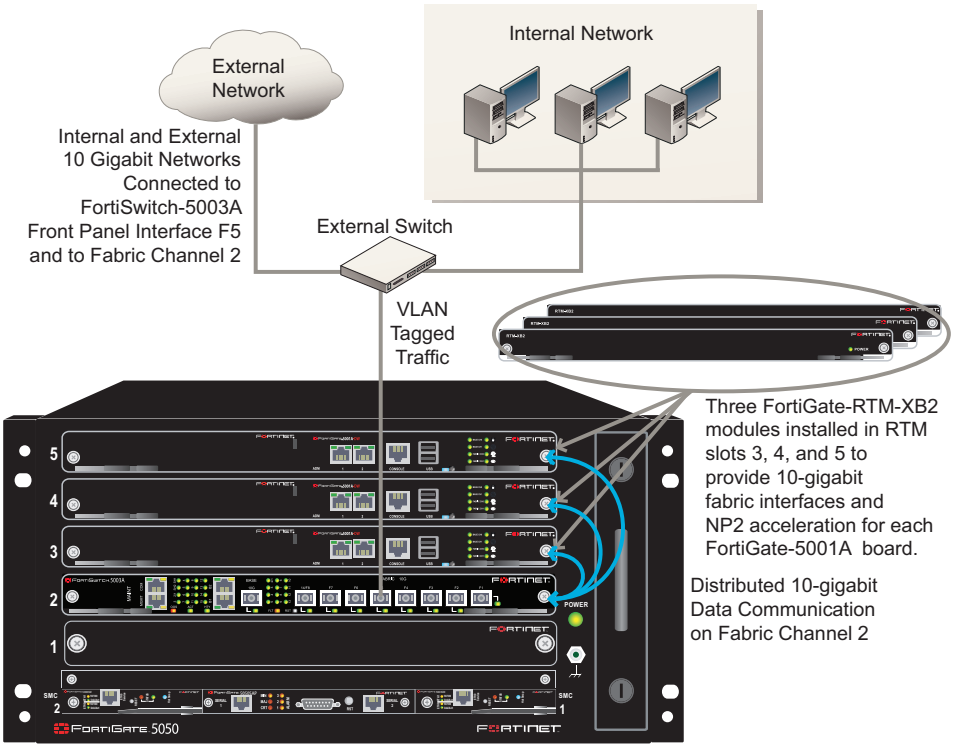
Layer-2 link aggregation and redundancy configurations

The FortiSwitch-5003A board supports 802.3ad layer-2 link aggregation, 802.1q VLANs, and 802.1s Multi-Spanning Tree Protocol (MTSP) for the fabric channels. You can use these features to configure link aggregation and support redundant FortiSwitch-5003A switch configurations to distribute traffic to multiple FortiGate-5000 boards.

See the *FortiGate-5000 Backplane Communication Guide* for more information about FortiSwitch-5003A link aggregation and redundancy.

Figure 6 shows a basic link aggregation configuration using a single FortiSwitch-5003A board. In this configuration the external switch is connected to FortiSwitch-5003A front panel f5 interface. The switch adds VLAN tags to traffic from the internal and external networks.

Figure 6: Basic link aggregation configuration


Internal Network
External Network
Internal and External 10 Gigabit Networks Connected to FortiSwitch-5003A Front Panel Interface F5 and to Fabric Channel 2
External Switch
VLAN Tagged Traffic
Three FortiGate-RTM-XB2 modules installed in RTM slots 3, 4, and 5 to provide 10-gigabit fabric interfaces and NP2 acceleration for each FortiGate-5001A board.
Distributed 10-gigabit Data Communication on Fabric Channel 2
FortiGate-5050
FORTINET

Hardware installation

Before use, the FortiSwitch-5003A module must be correctly inserted into the first or second hub/switch fabric slot of an Advanced Telecommunications Computing Architecture (ACTA) chassis such as the FortiGate-5140 or FortiGate-5050.

Before inserting the board into a chassis you should make sure the configuration switch is set correctly.

This chapter describes:

- Setting the FortiSwitch-5003A configuration switch
- FortiSwitch-5003A mounting components
- Inserting a FortiSwitch-5003A board
- Removing a FortiSwitch-5003A board
- Resetting a FortiSwitch-5003A board
- Troubleshooting

Setting the FortiSwitch-5003A configuration switch

The SW3 switch on the FortiSwitch-5003A board is factory set by Fortinet with the front panel 14/F8 interface enabled and the fabric backplane slot 14 disabled. This means you can connect the FortiSwitch-5003A front panel 14/F8 interface to a network but you cannot connect a FortiGate-5000 board in slot 14 to the fabric backplane.

The SW3 switch on the FortiSwitch-5003A board can be used to switch between enabling 14/F8 front panel interface and enabling the fabric backplane slot 14 interface.

Figure 7: SW3 factory default setting (front panel interface 14/F8 enabled)

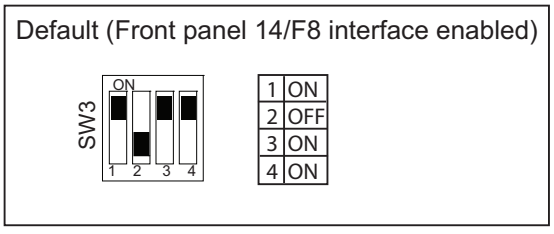
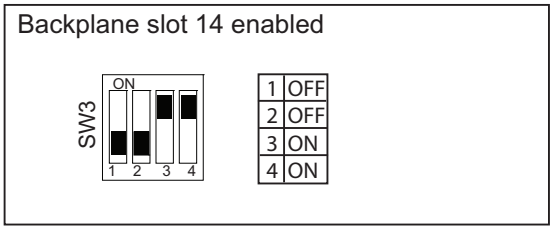


Figure 8: SW3 changed (backplane slot 14 enabled)



To change or verify the SW3 switch settings

To complete this procedure, you need:

- A FortiSwitch-5003A board
- A tool for changing the SW3 switch setting (optional)
- An electrostatic discharge (ESD) preventive wrist strap with connection cord

Caution: FortiSwitch-5003A boards must be protected from static discharge and physical shock. Only handle or work with FortiSwitch-5003A boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiSwitch-5003A boards.

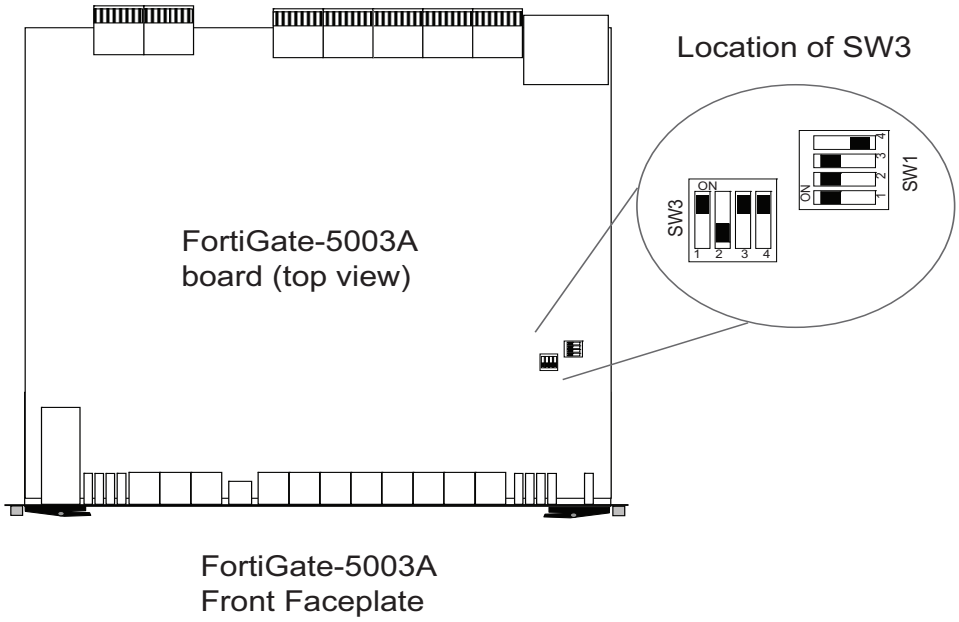
1 Attach the ESD wrist strap to your wrist and to an ESD socket or to a bare metal surface on a chassis or frame.

2 If you have installed the FortiSwitch-5003A board in a chassis, remove it.

For removal instructions, see "Removing a FortiSwitch-5003A board" on page 18.

3 Use Figure 9 to locate SW3 on the FortiSwitch-5003A board.

Figure 9: Location of SW3 on the FortiSwitch-5003A board



4 If required, change SW3 to the required setting (see Figure 7 and Figure 8).

5 Insert the FortiSwitch-5003A board into a chassis and verify that the board starts up and operates correctly.

For inserting instructions, see "Inserting a FortiSwitch-5003A board" on page 16.

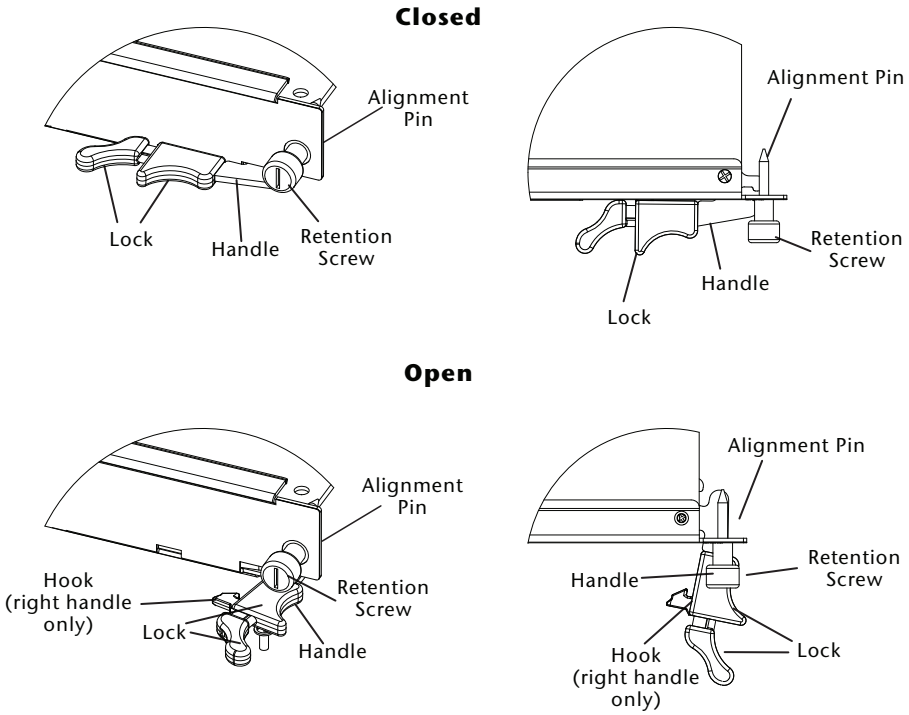
FortiSwitch-5003A mounting components

To install a FortiSwitch-5003A board you slide the board into a hub/switch fabric slot in the front of an ATCA chassis and then use the mounting components to lock the board into place in the slot. When locked into place and positioned correctly the board front panel is flush with the chassis front panel. The board is also connected to the chassis backplane.

Note: FortiSwitch-5003A boards are horizontal when inserted into a FortiGate-5050 chassis and vertical when inserted into a FortiGate-5140 chassis. The inserting and removing procedures are the same in either case. For clarity the descriptions in this document refer to the left (top) and right (bottom) mounting components

To position the board correctly you must use the mounting components shown in Figure 10 for the right (bottom) of the FortiSwitch-5003A front panel. The mounting components on the left (top) of the front panel are the same but reversed. The FortiSwitch-5003A mounting components align the board in the chassis slot and are used to insert and eject the board from the slot.

Figure 10: FortiSwitch-5003A right (bottom) mounting components



The FortiSwitch-5003A handles align the board in the chassis slot and are used to insert and eject the board from the slot. The right (bottom) handle activates a microswitch that turns on or turns off power to the board. When the right (bottom) handle is open the microswitch is off and the board cannot receive power. When the right (bottom) handle is fully closed the microswitch is on and if the board is fully inserted into a chassis slot the board can receive power.

Note: You can use front panel reset switch to cycle the power and reset the board without removing the board from the chassis. See “Resetting a FortiSwitch-5003A board” on page 20.

Inserting a FortiSwitch-5003A board

The FortiSwitch-5003A board must be fully installed in a chassis slot, with the handles closed and locked and retention screws fully tightened for the FortiSwitch-5003A board to receive power and operate normally. If the FortiSwitch-5003A board is not receiving power, the HS LED glows solid blue and all other LEDs remain off. See “Front panel LEDs and connectors” on page 6.

It is important to carefully seat the FortiSwitch-5003A board all the way into the chassis, to not use too much force on the handles, and to make sure that the handles are properly locked. Only then will the FortiSwitch-5003A board power-on and start up correctly.

FortiSwitch-5003A boards are hot swappable. The procedure for inserting a FortiSwitch-5003A board into a chassis slot is the same whether or not the chassis is powered on.

To insert a FortiSwitch-5003A board into a chassis slot

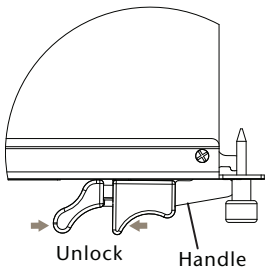
Caution: Do not carry the FortiSwitch-5003A board by holding the handles or retention screws. When inserting or removing the FortiSwitch-5003A board from a chassis slot, handle the board by the front panel. The handles are not designed for carrying the board. If the handles become bent or damaged the FortiSwitch-5003A board may not align correctly in the chassis slot.

To complete this procedure, you need:

- A FortiSwitch-5003A board
- An ATCA chassis with an empty hub/switch fabric slot
- An electrostatic discharge (ESD) preventive wrist strap with connection cord

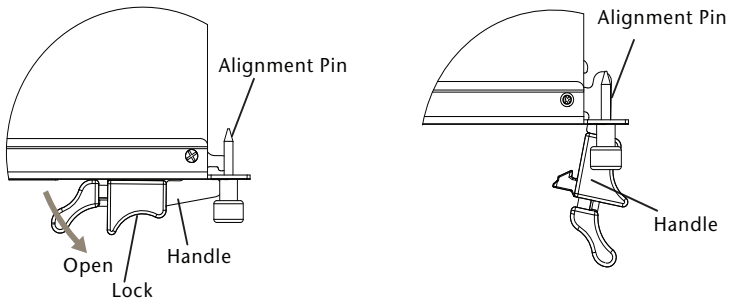
Caution: FortiSwitch-5003A boards must be protected from static discharge and physical shock. Only handle or work with FortiSwitch-5003A boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiSwitch-5003A boards.

1. Attach the ESD wrist strap to your wrist and to an ESD socket or to a bare metal surface on the chassis or frame.
2. If required, remove the protective metal frame that the FortiSwitch-5003A board has been shipped in.
3. Insert the FortiSwitch-5003A board into the empty slot in the chassis.
4. Unlock the handles by squeezing the handle locks.



5. Open the left (top) and right (bottom) handles to their fully open positions.

Caution: To avoid damaging the lock, make sure you squeeze the handles fully to unlock them before opening. The handles should pop easily out of the board front panel.



6 Insert the FortiSwitch-5003A board into the empty slot in the chassis.

7 Carefully guide the board into the chassis using the rails in the slot.

Insert the board by applying moderate force to the front faceplate (not the handles) to slide the board into the slot. The board should glide smoothly into the chassis slot. If you encounter any resistance while sliding the board in, the board could be aligned incorrectly. Pull the board back out and try inserting it again.

8 Slide the board in until the alignment pins are inserted half way into their sockets in the chassis.

9 Turn both handles to their fully-closed positions.

The handles should hook into the sides of the chassis slot. Closing the handles draws the FortiSwitch-5003A board into place in the chassis slot and into full contact with the chassis backplane. The FortiSwitch-5003A front panel should be in contact with the chassis front panel. When the handles are fully-closed they lock into place.

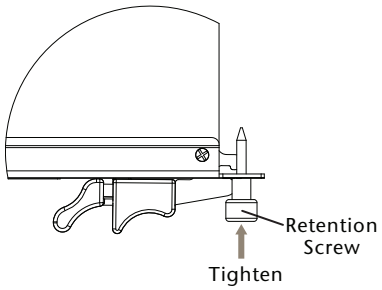
As the right (bottom) handle closes the microswitch is turned on, supplying power to the board. If the chassis is powered on the HS LED starts flashing blue. If the board is aligned correctly, inserted all the way into the slot, and the right (bottom) handle is properly closed the HS LED flashes blue for a few seconds. At the same time the ACT and HTY LEDs turn green. After a few seconds the HS LED goes out and the FortiSwitch-5003A firmware starts up. If the board is operating correctly, the front panel LEDs are lit as described in Table 6.

Table 6: FortiSwitch-5003A normal operating LEDs

LED	State
OOS (Out of Service)	Off
ACT (Active)	Green
HTY (Healthy)	Green
FLT (Fault)	Off

If the board has not been inserted properly the HS LED changes to solid blue and all other LEDS turn off. If this occurs, open the handles, slide the board part way out, and repeat the insertion process.

10 Once the board is inserted correctly, fully tighten the retention screws to lock the FortiSwitch-5003A board into position in the chassis slot.



Removing a FortiSwitch-5003A board

The following procedure describes how to correctly use the FortiSwitch-5003A mounting components described in "FortiSwitch-5003A mounting components" on page 15 to remove a FortiSwitch-5003A board from an ATCA chassis slot.

FortiSwitch-5003A boards are hot swappable. The procedure for removing a FortiSwitch-5003A board from a chassis slot is the same whether or not the chassis is powered on.

To remove a FortiSwitch-5003A board from a chassis slot

Caution: Do not carry the FortiSwitch-5003A board by holding the handles or retention screws. When inserting or removing the FortiSwitch-5003A board from a chassis slot, handle the board by the front panel. The handles are not designed for carrying the board. If the handles become bent or damaged the FortiSwitch-5003A board may not align correctly in the chassis slot.

To complete this procedure, you need:

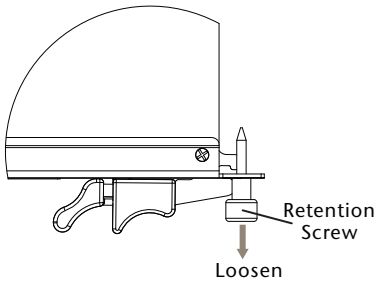
- An ATCA chassis with a FortiSwitch-5003A board installed
- An electrostatic discharge (ESD) preventive wrist strap with connection cord

Caution: FortiSwitch-5003A boards must be protected from static discharge and physical shock. Only handle or work with FortiSwitch-5003A boards at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FortiSwitch-5003A boards.

1 Attach the ESD wrist strap to your wrist and to an ESD socket or to a bare metal surface on the chassis or frame.

2 Disconnect all cables from the FortiSwitch-5003A board, including all network cables and the console cable.

3 Fully loosen the FortiSwitch-5003A retention screws.

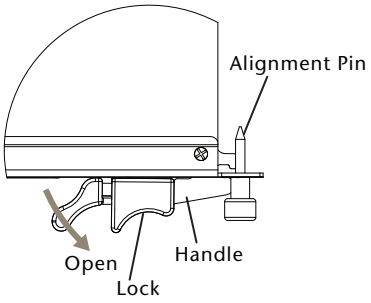


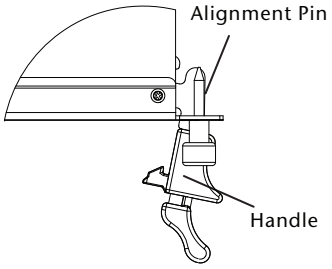
4 Unlock the handles by squeezing the handle locks.

5 Open the handles to their fully open positions.

Caution: To avoid damaging the lock, make sure you squeeze the handles fully to unlock them before opening. The handles should pop easily out of the board front panel.

Opening the handles turns off the microswitch, turns off all LEDs, and ejects the board from the chassis slot. You need to use moderate pressure on the handles to eject the board.

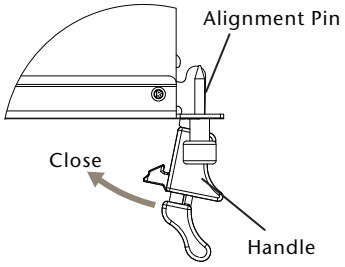


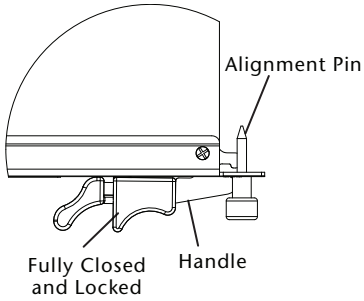


6 Pull the board about half way out.

7 Turn both handles to their fully-closed positions.

When the handles are fully-closed they lock into place.





8 Carefully slide the board completely out of the slot.

9 Re-attach the protective metal frame if you are going ship the FortiSwitch-5003A board or store it outside of a chassis.

Resetting a FortiSwitch-5003A board

You can use the front panel reset switch to cycle the power and reset the FortiSwitch-5003A board without ejecting the board from its slot. Press and hold the reset switch for three seconds to restart the board. For the location of the reset switch, see "The FortiSwitch-5003A board includes the following features:" on page 5.

Troubleshooting

This section describes the following troubleshooting topics:

- FortiSwitch-5003A does not startup

FortiSwitch-5003A does not startup

Positioning of FortiSwitch-5003A handles and a few other causes may prevent a FortiSwitch-5003A board for starting up correctly.

All chassis: handles not fully closed

If the handles are damaged or positioned incorrectly the FortiSwitch-5003A board will not start up. Make sure the handles are correctly aligned, fully inserted and locked.

All chassis: Firmware problem

If the FortiSwitch-5003A board is receiving power and the handles are fully closed, and you have restarted the chassis and the FortiSwitch-5003A still does not start up, the problem could be with FortiOS. Connect to the FortiSwitch-5003A console and try cycling the power to the board. If the BIOS starts up, interrupt the BIOS startup and install a new firmware image. For details about installing a new firmware image in this way, see the *FortiGate-5000 Series Firmware and FortiUSB Guide*.

If this does not solve the problem, contact Fortinet Technical Support.

Quick Configuration Guide

This section is a quick start guide to connecting and configuring a FortiSwitch-5003A board.

Before using this chapter, your FortiGate-5000 series or compatible ATCA chassis should be mounted and connected to your power system. In addition, your FortiSwitch-5003A board should be inserted into the chassis. The FortiSwitch-5003A board should also be powered up and the front panel LEDs should indicate that the boards are functioning normally.

This chapter includes the following topics:

- Registering your Fortinet product
- Factory default settings
- Basic configuration
- Upgrading FortiSwitch-5003A firmware
- Additional configuration

Registering your Fortinet product

Register your Fortinet product to receive Fortinet customer services such as product updates and technical support. You must also register your product for FortiGuard services such as FortiGuard Antivirus and Intrusion Prevention updates and for FortiGuard Web Filtering and AntiSpam.

Register your product by visiting http://support.fortinet.com and selecting Product Registration.

To register, enter your contact information and the serial numbers of the Fortinet products that you or your organization have purchased. You can register multiple Fortinet products in a single session without re-entering your contact information.

Factory default settings

The FortiSwitch-5003A unit ships with a factory default configuration. The default configuration allows you to connect to and use the FortiSwitch-5003A CLI to configure the FortiSwitch-5003A board. To configure the FortiSwitch-5003A board you add an administrator password, change the management interface IP address, and, if required, configure the default route for the management interface.

Table 7: FortiSwitch-5003A factory default settings

Administrator Account	User Name: admin Password: (none)
MGMT IP/Netmask	192.168.1.99/24
Default route	Gateway: 192.168.1.254 Device: mgmt

Note: At any time during the configuration process, if you run into problems, you can reset the FortiSwitch-5003A board to the factory defaults and start over. From the CLI enter `execute factory-reset`.

Basic configuration

1. Use the serial cable supplied with your FortiSwitch-5003A board to connect the front panel RJ-45 COM port to the management computer serial port.

   You can also connect to the CLI using an SSH or Telnet connection to the MGMT interface. The default IP address is 192.168.1.99/24.

2. Start a terminal emulation program (HyperTerminal) on the management computer. Use these settings:

Baud Rate (bps)	9600
Data bits	8
Parity	None
Stop bits	1
Flow Control	None

3. At the Login: prompt, type admin and press Enter twice (no password required).

4. Change the administrator password.

   ```
   config admin user
     edit admin
       set password <password>
     next
   end
   ```

5. Configure the mgmt interface.

   ```
   config system interface
     edit mgmt
       set ip <ip_address>/<netmask>
     next
   end
   ```

   If you have connected to the FortiSwitch-5003A CLI using telnet or SSH, since this step changes the mgmt interface IP address you will have to re-establish the Telnet or SSH session.

6. Configure the default gateway for the management interface.

   ```
   config route static
     edit 1
       set gateway <gateway_ip>
     next
   end
   ```

7. If your are installing two FortiSwitch-5003A boards in the same chassis, you may need to enter the following command to disable communication between them.

   ```
   config switch fabric-channel physical-port
     edit slot-2/1
       set status down
     end
   ```

```
end
```

See the *FortiGate-5000 Backplane Communication Guide* for more information.

Upgrading FortiSwitch-5003A firmware

Fortinet periodically updates the FortiSwitch-5003A FortiOS firmware to include enhancements and address issues. After you have registered your FortiSwitch-5003A security system (see "Registering your Fortinet product" on page 21) you can download FortiSwitch-5003A firmware from the support web site http://support.fortinet.com.

To upgrade the firmware

To use the following procedure, you must have a TFTP server the FortiSwitch-5003A board can connect to.

1. Make sure the TFTP server is running.
2. Copy the new firmware image file to the root directory of the TFTP server.
3. Log into the FortiSwitch-5003A CLI.
4. Make sure the FortiGate board can connect to the TFTP server.

   You can use the following command to ping the computer running the TFTP server. For example, if the IP address of the TFTP server is 192.168.1.168:

   ```
   execute ping 192.168.1.168
   ```

5. Enter the following command to copy the firmware image from the TFTP server to the FortiSwitch-5003A board:

   ```
   execute restore image tftp <name_str> <tftp_ipv4>
   ```

   Where `<name_str>` is the name of the firmware image file and `<tftp_ipv4>` is the IP address of the TFTP server. For example, if the firmware image file name is `image.out` and the IP address of the TFTP server is 192.168.1.168, enter:

   ```
   execute restore image tftp image.out 192.168.1.168
   ```

   The FortiSwitch-5003A board responds with the message:

   ```
   This operation will replace the current firmware version
   Do you want to continue? (y/n)
   ```

6. Type `y`.

   The FortiSwitch-5003A board uploads the firmware image file, upgrades to the new firmware version, and restarts. This process takes a few minutes.

7. Reconnect to the CLI.
8. To confirm the firmware image is successfully installed, enter:

   ```
   get system status
   ```

Additional configuration

You can use the FortiSwitch-5003A CLI to configure other basic system settings such as using `config system global` to set system time settings and change the system host name. Execute commands are also available for setting the system time and date and backing up the configuration.

If you are using the FortiSwitch-5003A system for link aggregation or just to pass VLANs you need to use the `config switch fabric-channel` command. This command has 4 keywords:

- `interface` to add VLANs to interfaces and other settings
- `physical-port` to enable listening for heartbeats from FortiGate-5000 units on the fabric channel and to configure interfaces to be up or down
- `stp` to configure MTSP
- `trunk` to aggregate FortiSwitch-5003A fabric interfaces

See "Layer-2 link aggregation and redundancy configurations" on page 12 for some examples of using these commands. See also the *FortiGate-5000 Backplane Guide* for a complete FortiSwitch-5003A CLI reference as well as example FortiSwitch-5003A configurations.

For more information

Support for your Fortinet product is available as online help from within the web-based manager, from the Tools and Documentation CD included with the product, on the Fortinet Technical Documentation web site, from the Fortinet Knowledge Center web site, as well as from Fortinet Technical Support.

Fortinet documentation

The most up-to-date publications and previous releases of Fortinet product documentation are available from the Fortinet Technical Documentation web site at http://docs.forticare.com. FortiGate-5000 series documentation is located in its own section of the site at http://docs.forticare.com/fgt5k.html.

Fortinet Tools and Documentation CD

Fortinet documentation is available from the Fortinet Tools and Documentation CD shipped with your Fortinet product. The documents on this CD are current for your product at shipping time. For the latest versions of all Fortinet documentation see the Fortinet Technical Documentation web site at http://docs.forticare.com.

Fortinet Knowledge Center

Additional information about Fortinet products is available from the Fortinet Knowledge Center. The knowledge center contains troubleshooting and how-to articles, FAQs, technical notes, and more. Visit the Fortinet Knowledge Center at http://kc.forticare.com.

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